REMARKS

This Amendment is filed in response to the Office Action mailed August 28, 2008. Applicant thanks the Examiner for the Interview held on December 2, 2008. The subject matter contained herewith is in accord with the Examiner's comments made during the interview and the Examiner indicated that a new search would be performed based on the claimed amendments. All rejections and objections are respectably traversed.

Claims 23 – 54 are pending in this case.

Claims 23, 25, 30 – 31, 33 – 36, 39 – 40, and 46 – 49 have been amended.

Claim 50 – 54 have been added.

Request for Examiner Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before issuance of the next Office Action. The Applicant's undersigned attorney may be reached at 617-951-2500.

Claim Objections

At paragraph 6 of the Office Action, claims 47 and 48 were objected to for informalities. Applicant respectfully submits that the amendment to the claims satisfies the objections.

Claim rejections – 35 U.S.C. §112

At paragraphs 7 – 9 of the Office Action claim 49 was were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. Applicant respectfully submits that the amendment to the claim satisfies the rejection.

Claim rejections – 35 U.S.C. §101

At paragraphs 10 – 12 of the Office Action claim 49 was were rejected under 35 U.S.C. §101. Specifically, the Examiner asserts that "[t]he Applicants' specification fails to give a specific definition to the term 'computer-readable media.'" (See Office Action, paragraph 12). Applicant respectfully submits that the amendment to the claim satisfies the rejection. Further, Applicant respectfully submits that the claim is fully supported by Applicant's Specification, page 14, lines 23 – 29 that states:

> Each such computer program is preferably stored on a <u>storage medium</u> or device (e.g., CD-ROM, hard disk or magnetic diskette) that is <u>readable by a general or special purpose programmable computer</u> for configuring and operating the computer when the storage medium or device is read by the computer to perform the procedures described. The system also may be implemented as a **computer-readable storage medium**, configured with a computer program, where the storage medium so configured causes a computer to operate in a specific and predefined manner. (Emphasis added).

Accordingly, Applicant respectfully submits that claim 49 is in condition for allowance.

Claim rejections – 35 U.S.C. §102

At paragraphs 13 – 27 of the Office Action claims 23, 26, 28, 29, 31, 34, 36, 37, 39 – 41, 45, and 46 were rejected under 35 U.S.C. §102(b) as being anticipated by Ohran et al., U.S. Patent No. 5,649,152 (hereinafter "Ohran").

The present invention, as set forth in representative claim 23 comprises in part:

> 23.   A storage system, comprising:
> a destination to store a copy from a source;
> *a first process to initiate a copy operation of the source, wherein the copy operation includes copying each block of the source to the destination, the copy operation being performed in segments and each segment being a range of data bytes of the source*;
> **the storage system to receive a write request to modify a requested range of data bytes of the source** *while the copy operation is in progress*, wherein the write request to modify the requested range of data bytes is a write request range;
> *the storage system to determine if the write request range falls within the range of data bytes of the source being copied*;

> *in response to determining that the write request range fall*
> *within the range of data bytes of the source being copied, the storage sys-*
> *tem to determine if the range of data bytes of the source have been written*
> *to a snapshot;*
>> in response to determining that the range of data bytes of the
> source have been written to the snapshot, the write request to be written to
> the source; and
>> in response to determining that the range of data bytes of the
> source have not been written to the snapshot, a second process first to
> copy the range of data bytes of the source to the snapshot, and then the
> second process to write the write request to the source.

First, Applicant respectfully submits that the amendment to the claims are full

supported by Applicant's Specification at page 2, lines 20 – 23 which states:

> The invention provides an apparatus and a method <u>for copying a source</u>
> <u>data object to a destination</u> data object while maintaining data coherency.
> The source data object is controlled by a source storage device controller,
> and the destination data object is controlled by a destination storage device
> controller. (Emphasis added).

Moreover, page 2, lines 11 – 14 of Applicant's Specification further support the

amendment to the claims. Specifically,

> During the snapshot operation, the file server intercepts write operations to
> the data while backing-up the unchanged data before allowing the write
> operations to modify the data. <u>During the copy operation, the file server</u>
> <u>reads each data block to be copied and writes it to the target storage de-</u>
> <u>vice</u>. (Emphasis added).

Accordingly, Applicant respectfully submits that the amendment to the claims is

fully supported by Applicant's Specification.

Ohran discloses a system and method for providing a static snapshot of data

stored on a mass storage system. (See Ohran, Abstract). " First, a preservation memory is

cleared and a virtual device is created." (See Ohran, Abstract). The virtual device will

appear as a mass storage device containing the static image. (See Ohran, col. 2, lines 52

– 53). "Write operations to the mass storage system are…intercepted by the method."

(See Ohran, col. 2, lines 54 – 55). "[i]f there is not a block associated with the mass stor-age write address in preservation memory...a copy of the block of data currently located at the mass storage address [is placed] in preservation memory." (emphasis added) (See Ohran, col. 5, lines 50 – 52 and col. 4, lines 41 - 48"the method of the invention only re-quires storage equal to the number of mass storage blocks <u>that have been changed since the static image was created</u>." (Emphasis added) (See Ohran, col. 3, lines 3 – 5).

Applicant respectfully submits Ohran fails to teach or suggest Applicant's claimed novel ***a first process to initiate a copy operation*** *of the source, wherein the copy operation includes copying each block of the source to the destination, the copy opera-tion being performed in segments and each segment being a range of data bytes of the source*, AND **the storage system to receive a write request to modify a requested range of data bytes of the source** <u>***while the copy operation is in progress***</u>-AND *the storage system to determine if the write request range falls within the range of data bytes of the source being copied* AND *in response to determining that the write request range fall within the range of data bytes of the source being copied, the storage system to determine if the range of data bytes of the source have been written to a snapshot.*

In short, Applicant's novel claims recites a system that receives a write request while the copy operation is occurring (i.e., each block of the source is being copied to the destination), while Ohran discloses a technique where a write request is directed to a number of storage blocks and only those storage blocks are copied to the static snapshot image.

Specifically, Ohran discloses that any write operations directed to the storage sys-tem are intercepted. (See Ohran, col. 4, lines 30 – 32). "[I]f there is not a block of data associated with the mass storage write address in preservation memory...Step 212 places a copy of the block of data currently located at the mass storage write address in preser-vation memory 106." (See Ohran, col. 5, lines 48 – 52). Therefore, only those blocks of data that have a write requests directed to them are copied to the preservation memory. Thus, for example, if blocks 4 – 8 of the mass storage system never receive a write re-

quest, then according to Ohran, those blocks will never be copied to the preservation memory. This is fully supported by the disclosure of Ohran which explicitly states "the method of the invention <u>only</u> requires storage equal to the number of mass storage blocks <u>that have been changed since the static image was created.</u>" (See Ohran, col. 3, lines 3 – 5).

Quite different from Ohran, Applicant's copy operation is a copy of each block of a source to a destination. **During the copy of the source to the destination**, a write request is received.

Applicant respectfully submits that Ohran has no disclosure of this aspect of Applicant's novel claim. Instead, Ohran merely copies only those blocks have a write request directed to them.

As a direct result of the above comments, Ohran also fails to teach or suggest Applicant's novel *the storage system to determine if the write request range falls within the range of data bytes of the source being copied*, because Ohran is not performing a copy operation while the write request is received. Moreover, Ohran fails to teach or suggest Applicant's claimed novel *in response to determining that the write request range fall within the range of data bytes of the source being copied, the storage system to determine if the range of data bytes of the source have been written to a snapshot*, because as noted above, Ohran is not performing a copy operation as is disclosed by Applicant.

Accordingly, Applicant respectfully submits that Ohran is legally insufficient to render the present claims unpatentable under 35 U.S.C. §102(b) because of the absence in Ohran of Applicant's claimed novel *a first process to initiate a copy operation of the source, wherein the copy operation includes copying each block of the source to the destination, the copy operation being performed in segments and each segment being a range of data bytes of the source*, AND **the storage system to receive a write request to modify a requested range of data bytes of the source** *<u>while the copy operation is in progress</u>*-AND *the storage system to determine if the write request range falls within the range of data bytes of the source being copied* AND *in response to determining that*

the write request range fall within the range of data bytes of the source being copied,
the storage system to determine if the range of data bytes of the source have been written
to a snapshot.

Claim rejections – 35 U.S.C. §103

At paragraphs 28 – 32 of the Office Action claim 49 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ohran in view of Smith et al., U.S. Patent No. 5,241,631 (hereinafter "Smith").

At paragraphs 28 – 30 and 33 – 35 of the Office Action claims 24, 27, 32, and 35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ohran as applied to claims 23, 26, 28, 29, 31, 34, 36, 27, 37 – 41, 45 and 46 above, in view of Tawil, U.S. Patent No. 6,421,723.

At paragraphs 28 – 30 and 36 – 39 of the Office Action, claims 25, 33, 47 and 48 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ohran as applied to claims 23, 26, 28, 29, 31, 34, 36, 27, 37 – 41, 45 and 46 above, in view of Smith.

At paragraphs 28 – 30 and 40 – 41 of the Office Action, claims 30 and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ohran as applied to claims 23, 26, 28, 29, 31, 34, 36, 27, 37 – 41, 45 and 46 above, in view of Dulai et al., U.S. Patent No. 6,205,479.

At paragraphs 28 – 30 and 42 – 43 of the Office Action, claims 42 – 44 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ohran as applied to claims 23, 26, 28, 29, 31, 34, 36, 27, 37 – 41, 45 and 46 above, in view of Simpson et al., U.S. Patent No. 6,128,306.

Applicant respectfully notes that claims 24 – 25, 27, 30, 32 – 33, 35, 38, 42 – 44, and 47 – 49 are dependent claims that depend from independent claims believed to e in condition for allowance. Accordingly, claims 24 – 25, 27, 30, 32 – 33, 35, 38, 42 – 44, and 47 – 49 are believed to be in condition for allowance.

NEW CLAIMS

The present invention, as set forth in representative claim 23 comprises in part:

50. (New) A method for making a copy of data in a database, comprising:

    starting a copying operation of a source to a destination, wherein the copy operation is performed in segments and each segment is a range of data bytes of the source, the copy operation started at a begin time;

    maintaining a snapshot volume that includes each block of the source that has a write request directed to that block during the course of the copy operation;

    <u>*receiving a write request directed to the range of data bytes being currently copied to the destination*</u>;

    in response to determining that the range of bytes have not been copied to the snapshot volume, holding the write request until the range of bytes are copied to the snapshot volume;

    after completion of writing the range of bytes to the snapshot volume, executing the write request on the source to update the source with a changed data; and

    <u>*copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time*</u>.

Applicant respectfully submits that the amendments to the claims are full supported by Applicant's Specification at page 2, lines 20 – 31 which states:

The invention provides an apparatus and a method <u>for copying a source data object to a destination</u> data object while maintaining data coherency. The source data object is controlled by a source storage device controller, and the destination data object is controlled by a destination storage device controller…

Copying each block of the source data to a corresponding block in the destination data object in the absence of the snapshot version of the block and otherwise copying the snapshot version of the source data object block to the corresponding block in the destination data object…

Moreover, page 11, lines 1 - 8 of Applicant's Specification further support the amendment to the claims. Specifically,

Fig. 4 shows that the storage device controller performs copies while maintaining the coherency of the data object. Coherency includes maintaining the order of the data bytes and temporal relationship. Temporal relationship maintenance means that a copy of the data object started at 11 AM will result in all the data copied being in the state it was at 11 AM, even if the copy operation takes many hours to complete. Maintaining co-

herency requires that writes received by the Storage Device Controller for the data object being copied are either held back until the copy is complete or delayed a short time while data bytes to be changed by the write are copied to another location (i.e., snapshot).

Further, Applicant respectfully submits that for the same reasons asserted under the 102 analysis, Ohran fails to teach or suggest Applicant's novel claim.

Moreover, Applicant respectfully submits that Ohran is also completely silent with respect to Applicant's claimed novel *copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time*.

Accordingly, Applicant respectfully submits that Ohran is legally insufficient from render the new claim unpatentable under 35 U.S.C. §102(b) because of the absence in Ohran of Applicant's claimed novel *starting a copying operation of a source to a destination, wherein the copy operation is performed in segments and each segment is a range of data bytes of the source, the copy operation started at a begin time* AND *receiving a write request directed to the range of data bytes being currently copied to the destination* AND *in response to determining that the range of bytes have not been copied to the snapshot volume, holding the write request until the range of bytes are copied to the snapshot volume* AND *copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time*.

All independent claims are believed to be in condition for allowance.

All dependent claims are dependent from independent claims which are believed to be in condition for allowance. Accordingly, all dependent claims are believed to be in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account

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Respectfully submitted,

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